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Research Output 1: Kitagata Housing Reconstruction, Gifu Prefecture

Output Type: Design

Building: Kitagata Social Housing – Phase II 2001

Function: Housing

Location: Gifu, Japan

Client: Gifu Prefecture Housing Department

Practical Completion: February 2001

Budget: £15M

Area: 10,000m²

Funding: Gifu Prefecture and Central Government

300 Word Summary

Kitagata Social Housing – Phase II: a £15 million 100-unit housing block funded by the Gifu Prefecture, Japan, completed February 2001.

Questions/Aims/Objectives

- (1) To address existing housing problems: cramped, inflexible planning, environmentally dysfunctional conditions, ruthless uniformity.
- (2) To create flexible public housing suitable for contemporary/future needs, a more sustainable environment, a variety of spatial arrangement and aesthetic composition.

Contexts

Designed after Phase I occupation, Phase II incorporated resident feedback into design development. The design process analysed the balance between functionality and historic tradition and structural issues within an earthquake zone. Views were shared amongst the ethnically diverse group of architectural practices involved.

Methods

- (1) A comparative study of historic/contemporary/Asian/European housing to understand functionality, flexibility and environmental control.
- (2) Comparative physical/digital models to measure environmental efficiency and daylight, sunlight and shadow requirements.
- (3) Data from resident questionnaires, housing authorities and user-group meetings to address internal priorities and external context.
- (4) The development of a complex physical matrix as a design tool to demonstrate the combination of volume variants to give necessary modularity and external variation.
- (5) The integration of architectural and engineering ideas to produce a novel solution for structural stability in an earthquake zone.
- (6) A greater range of plan form and volume arrangement to produce an atypical model of social housing offering consumer choice and flexibility in internal planning.
- (7) Volumetric calculations to produce a triplex and double-height, mezzanine galleried apartment unusual in social housing.
- (8) Innovations in plan/sectional organization to create higher levels of natural ventilation.
- (9) Innovations in structure to accommodate traumatic lateral movement.
- (10) The elevation to respond to the difficulties of a highly idiosyncratic footprint and referenced the site in contrast to other post-war social housing.

Dissemination/Esteem

Exhibited: Frankfurt Architecture Museum (2004), GA Gallery, Tokyo (2002) and Gifu Exhibition Centre (2002). One of four developments including Keijo Sejima, Liz Diller and Aiko Takahachi.



Image 1

General Description

This is the second phase of a development of a block of 100 units of social housing situated in Gifu, central Japan.

Phase II required a 10% cut in overall budget and an additional requirement was to produce a small number of 90m² apartments.

Phase II site-work was completed in 2000. Practical completion of Phase II occurred in 2001. The building was occupied in 2001 and 2002.



Image 2

Research Questions/Aims/Objectives

The key aim of the project was to address the critical historic problems of Japanese social housing, including cramped, inflexible planning, environmentally dysfunctional conditions and an external identity of ruthless uniformity. The ambition was to create public housing that contributed more flexibly to contemporary and future needs and provide a more sustainable environment. Additionally, the design aimed to offer a greater variety of spatial arrangement and aesthetic composition, to produce a sense of space in an otherwise restricted setting.

The critical issue was that the standardised Japanese social housing template had not been challenged since 1945. No critical debate existed in which to measure efficiency and desirability and there were no analyses of material functionality and sustainability.

In particular, the objectives of Phase II were to analyse occupant feedback, to monitor the environmental and material performance of Phase I and to assess the spatial performance of the housing in response to user feedback.



Image 3

Research Context

(1) No studies had been done to understand how a changed demographic profile had affected domestic demand and utilisation. The design process offered an opportunity to analyse the required balance between functionality and historic tradition to examine data and uniquely share views with the four ethnically diverse group of architectural practices.

(2) Phase II was designed after Phase I occupation; resident feedback was incorporated into the design development for the second building.

(3) The building had to address the structural problems of an earthquake zone. This presented a particular challenge in the post Kobe era.



Image 4

Research Methods/ Design Solutions

(1) A comparative study was undertaken of historic and contemporary, Asian and European twentieth-century housing. Examples were examined for levels of functionality, flexibility and environmental control.

(2) Data from resident questionnaires, housing authority and user group meetings addressed issues of internal priorities and external context. The Housing Department of the Gifu City Prefecture used systematic questionnaire programmes to assess user satisfaction and to analyse spatial performance and functionality. The results of the first phase were positive. The waiting list for Phase II was particularly large reflecting levels of satisfaction from Phase I. We noted that those apartments that planned around the elliptical form were more difficult to utilise. Phase II avoided all elliptical forms in plan thereby negating the problems of internal arrangement experienced in Phase I.

(3) Comparative physical and digital models were constructed to measure for environmental efficiency and responses to the regulatory requirements of daylight, sunlight and shadow.

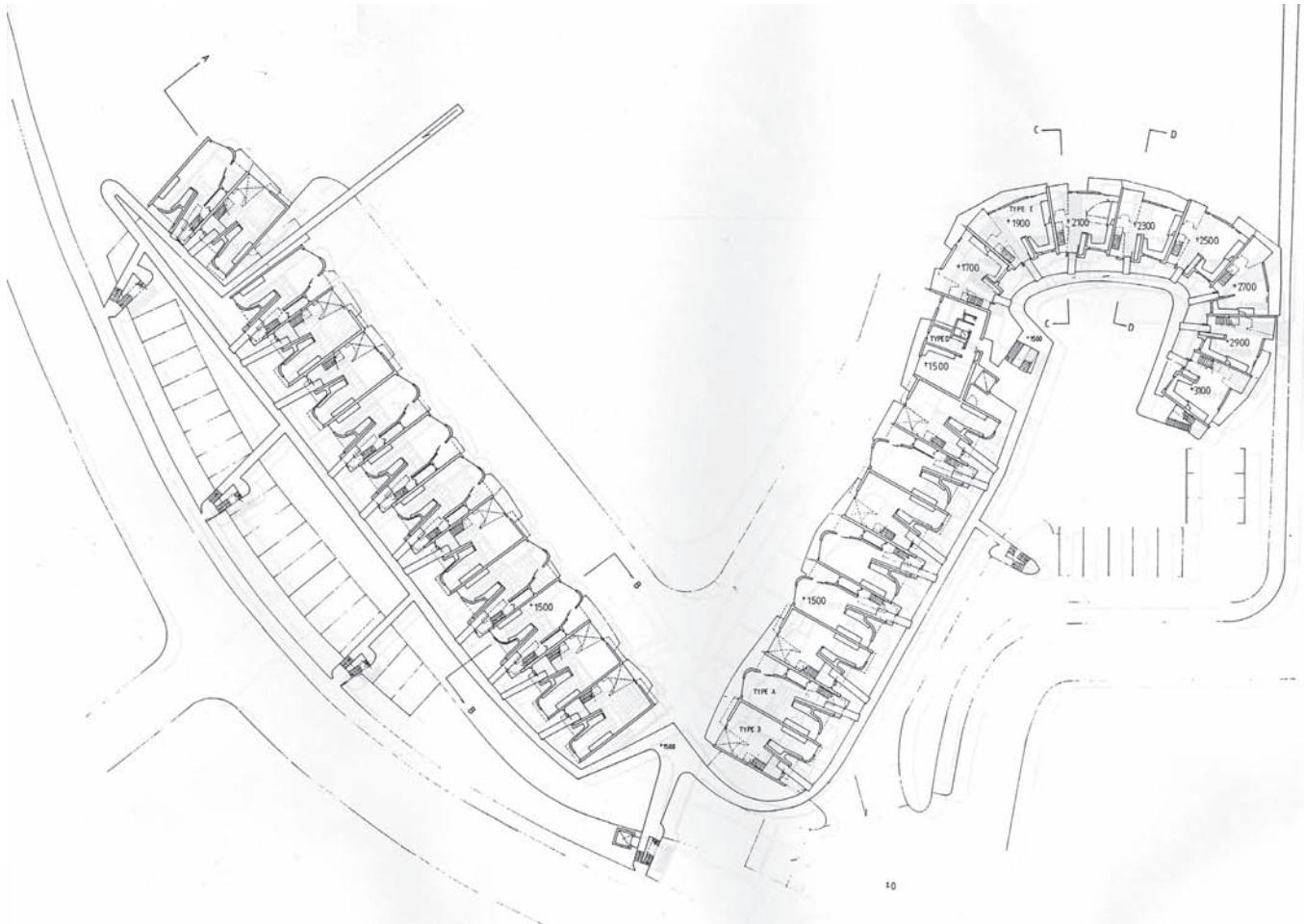


Image 5

(4) A complex physical matrix was developed as a design tool that demonstrated how volume variants could be combined to give necessary modularity and external variation. This produced a greater range of plan form and volume arrangement than is currently available in typical models of social housing, it also offered greater consumer choice and greater flexibility in the internal planning of the apartments.



Image 6

The variety acknowledged the historic importance of the extended family but also recognized the emerging social pattern of a nuclear family unit. Flexible partitioning offered the possibility of some re-configuration. Apartments for the elderly (and disabled) were integrated into blocks of family units. This fact allowed some families to live adjacent to elderly relatives.



Image 7

(5) A particularly close developmental relationship was required with the structural engineers to allow both architectural and engineering ideas to be integrated into a novel solution for structural stability in an earthquake zone.

The block is supported by a floating raft foundation which is highly unusual in an earthquake zone. Historically deep piled foundations have been used with the assumption that lateral resistance is desirable. Despite a large number of incurring sheared structure during tremors piling is still a common method of foundation. We worked with the engineers SDG to devise a plan that would accommodate some lateral flexibility if ground movement occurred. The cross walls to each apartment are indented to give them additional strength with structural breaks to accommodate movement. These indentations became an integral part of the design containing all ground level WCs. The building remains one of the few built in central Japan with a comparatively flexible foundation system.

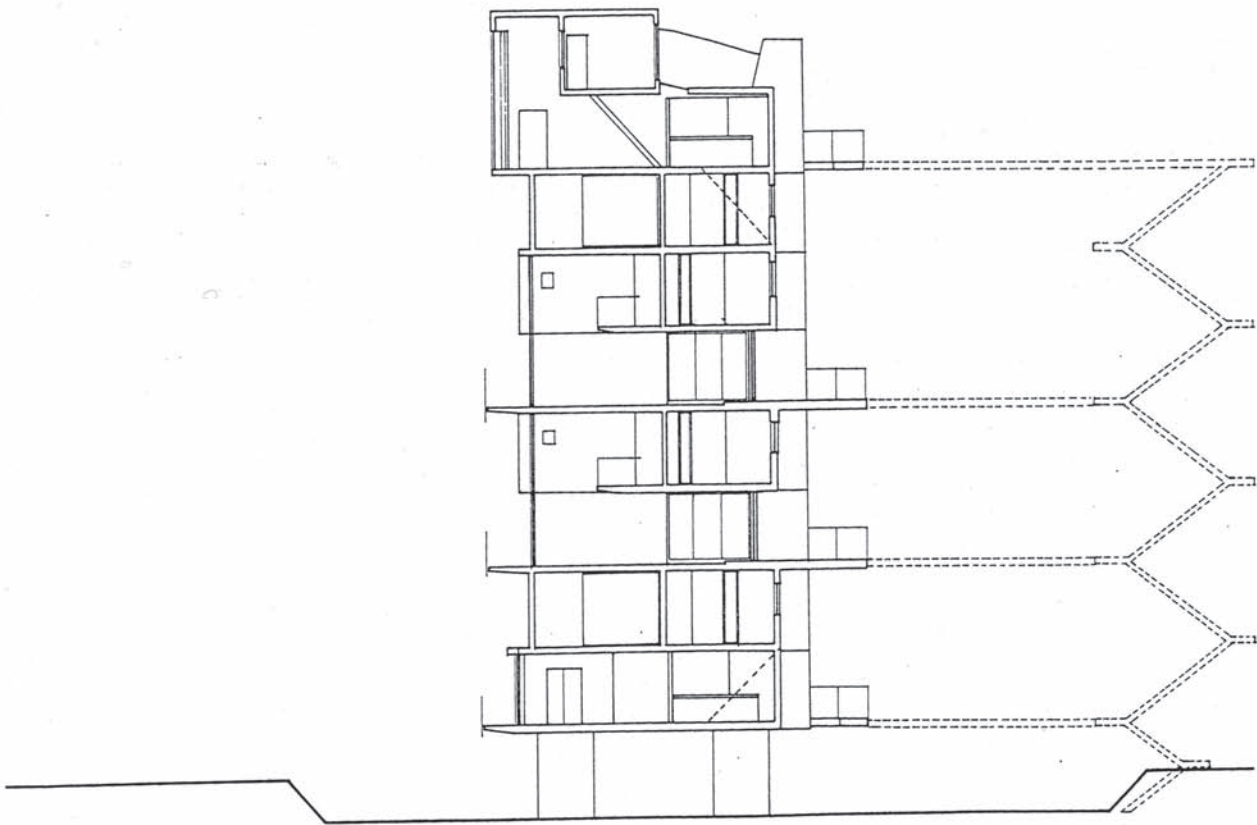


Image 8

(6) The particular volumetric calculations allowed a triplex and double height mezzanine galleried apartment to be created, which produced a sense of space in an otherwise restricted setting, by balancing the impact of the double height volumes, with the utility of uninterrupted floor space.



Image 9

The Phase II development continued to utilise a similar nature of spatial configuration to Phase I, yet, in addition this three storey (triplex) unit was developed – the only examples of their type within the typology of Japanese social housing. The access point differed in these apartments in that they were entered at the mid-point, maintaining entry to the public area and then allowing connections down to the bedrooms and up to the studio gallery. This type of apartment was significantly larger than those already constructed and in addition to the core areas, offered a double height living area, studio balcony and sun terrace.

The accommodation had to be organised to meet an un-negotiable spatial envelope (+/- o), where specific costs per unit (volume) could not be altered. The design exercise in this context required an absolutely precise manipulation of form, to accommodate the costing criteria.



Image 10

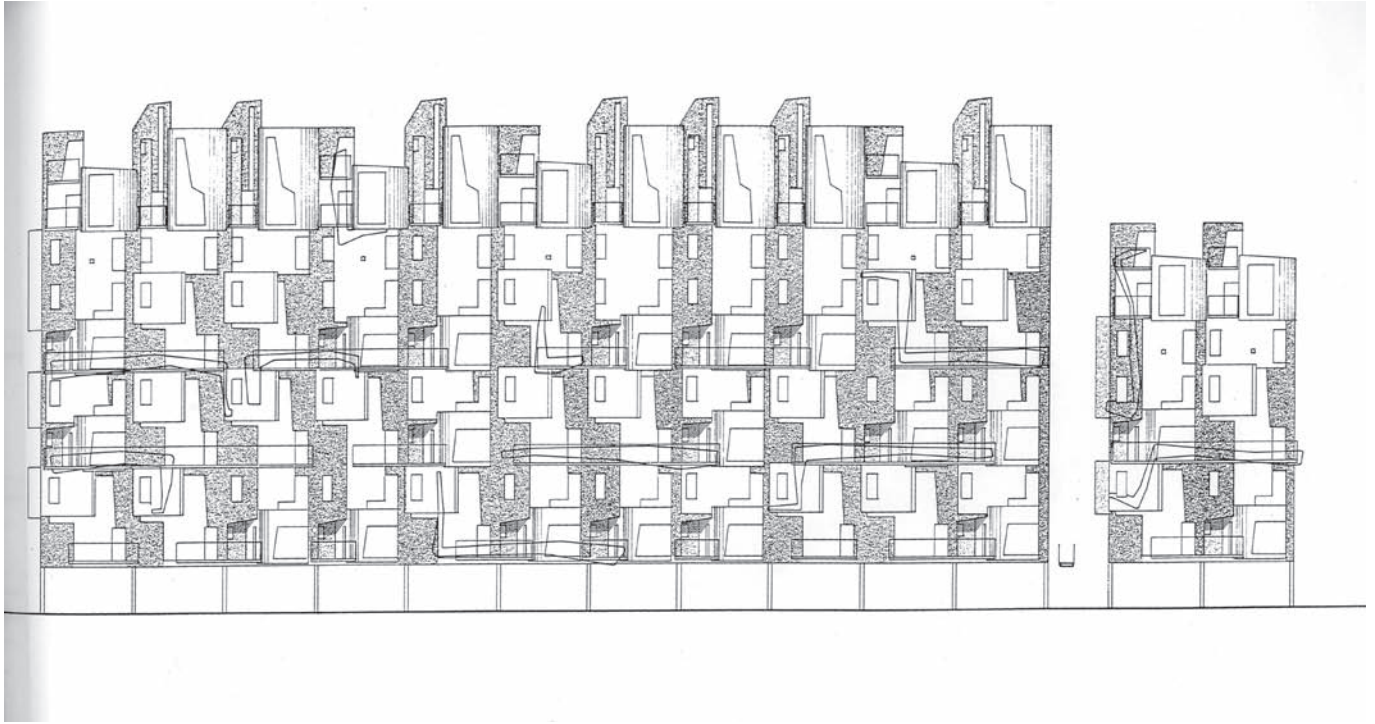


Image 11



Image 12

(7) The open plan and sectional organisation of the duplex and triplex apartments created higher levels of ventilation through accelerated air flow both vertically and horizontally, and therefore created less dependency on mechanical control, and greater natural environmental comfort. The apartments were constructed to maximize the use of natural environmental control thereby offering some control of relative humidity and thus minimizing material degradation. Particular attention was taken to ensure that cross ventilation and stack effect were maximised in the triplex apartments.



Image 13

(8) The plan form and in particular the apartment cross-wall profile were developed to work in tandem with a unique non-piled foundation where the floating slab worked in tandem with a series of indented cross-walls to provide the necessary vertical and lateral stability.

(9) The plan form, cross-wall profile and non-piled foundation were vital components in accommodating traumatic lateral movement.



Image 14

(10) The volumetric and plan matrix enabled an elevation to be designed that responded precisely to the difficulties of a highly idiosyncratic footprint. The geometric variance of the perimeter plan was integrated with a variegated plan and elevation profiles. The apartments were designed to also work in relation with the external landscaped – a component considered to be of particular importance by the residents. All apartments are dual aspect, the major aspect facing the interior landscaped. There was also a conscious desire to create an external identity, through sculptural range, colour and configuration that reflected and specifically referenced the site. This was in contrast to the universal uniformity that could be seen elsewhere in postwar social housing.

Dissemination

The project was exhibited at *Post-Modernism Revisited*, Deutsches Architektur Museum (DAM), Frankfurt (2004–2005), GA Gallery, Tokyo (2002) and Gifu Exhibition Centre (2002).

The project has been published in 'Life without Nostalgia', Ingeborg Flagge and Romana Schneider (eds) *Revision De Postmoderne/Post-Modernism Revisited* (Hamburg: Junius Verlag, 2005), catalogue for the exhibition *Post-Modernism Revisited*, Deutsches Architektur Museum (DAM), Frankfurt (2004–2005); *C3 Korea*, 0203, n. 21, pp. 82–97; 'Christine Hawley' in *The Architect: Women in Contemporary Architecture* (London: Wiley-Academy, 2001), pp. 96–101.

Esteem

This project was one of four developments, the other three were by highly respected international architects: Kejio Sejima, Liz Diller, Aiko Takahachi. The exhibition *Post-Modernism Revisited*, Deutsches Architektur Museum (DAM), Frankfurt (2004–2005) was curated to include many of the major international practices.

Image 1

Appendix 1: Related Articles

(1.1) 'Life without Nostalgia', Ingeborg Flagge and Romana Schneider (eds) *Revision De Postmoderne/Post-Modernism Revisited* (Hamburg: Junius Verlag, 2005), catalogue for the exhibition *Post-Modernism Revisited*, Deutsches Architektur Museum (DAM), Frankfurt (2004–2005).

(1.2) *C3 Korea*, 0203, n. 211, pp. 82–97.

(1.3) 'Christine Hawley' in *The Architect: Women in Contemporary Architecture* (London: Wiley-Academy, 2001), pp. 96–101.

